

INFLUENCE OF DIFFERENT KINDS OF HANDWRITING ON THE HYGIENIC POSTURE AND DEFORMITIES OF SCHOOL CHILDREN.

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Lately there has arisen in Mexico the old discussion as to the kind of handwriting which should be adopted in schools from a hygienic point of view, and the partisans both of sloping and upright letters have adduced esthetical, ophthalmological and pedagogical reasons in defense of each.

In the United States a movement has been begun, in the same direction, by the partisans of vertical letters against sloping ones,¹ the use of which is almost general in the different States of the Union.

The object of the present essay is to analyze, from the hygienic and ophthalmic point of view, the different requisites needed for handwriting so that its execution shall not cause thoracic deformities nor eye troubles, and so render the school injurious to the child's health.

When, more than twenty years ago, attention began to be drawn to deformities of the vertebral column brought on in school, and when statistics further proved that nearly 27 per cent. of the scholars in primary schools in Europe have a lateral curve of the spine resulting from bad postures on the school bench, especially when writing, the blame was laid on sloping penmanship for the inclination to place themselves crosswise or diagonally before the desk, which causes an advance of the right elbow, a lowering of the left, which comes off the desk, while the feet go to the left, leaving the right side in contact with the desk.

Statistics regarding myopia also proved that the too near approach of the eyes to the paper, produced by faulty postures, is one of the principal causes of the constant increase in the number and degree of cases of near-sightedness observed in schools. Even the fault of proper light was certainly considered as a very important factor, but of secondary value. So, in 1882, the School Hygiene Commission of France did not hesitate to fasten the responsibility for these bad postures and the increase of myopia, on slanting or English handwriting, and decided in favor of the upright letter, which, by obliging the scholar to form perpendicular strokes on lines placed parallel to the line which

¹ Dr. George M. Gould. Visual function the cause of slanting handwriting; *Medical Record*, April 22, 1905.

unites his eye-pupils and to the edge of the desk, compel him to hold his body straight. We must confess that these reproaches are fully justified in schools where the furniture is faulty, as I have seen for myself in a recent visit to one of the normal schools of Mexico.

However desirous masters may be to keep the scholar in an upright position, as recommended by good penmen, yet, if the height of the bench and that of the desk are not in proportion to the child's age, and if they do not preserve what is called "the minus distance," that is, with the edge of the seat under and to a certain extent inside the edge of the desk the scholar will necessarily have to adopt a bad posture, no matter what kind of writing he may be doing.

As the centre of gravity of the trunk is in front of the tenth dorsal vertebra, the body will only be at rest, in a sitting posture, when the perpendicular which passes through it falls on the line between the two seat-bones. Any movement which displaces this centre, either forward or backward, will make equilibrium unstable, and in order to preserve the position it will be necessary to seek a third point of support, which will be either forward, the top of the desk with the elbows upon it, when the pelvis muscles get tired, or backward upon the coccyx, when the scholar has not a seat with the proper conditions.

When the distance between the desk and the bench is plus or positive, that is, when the edge of the seat is outside of the perpendicular falling from the front edge of the desk, then the child must of necessity lean his whole trunk forward, and, if he is writing, support his left elbow on the desk while his feet go backward. The vertebral column is then partially turned, it does not support the head, the entire weight of which falls upon the muscles of the neck; these soon become tired, and then come into play those of the back, which in their turn get tired and let the trunk fall forward and downward between the shoulders whilst the head bends over the desk and the eyes approach too near the paper. This posture the French call diving, *plongeon*, and is peculiar not only to desks with a plus distance but also to those which have too high a bench or the top too low for the child's height. When the table is too high, the two arms cannot rest on it, at the same time, without forcing the shoulders upwards, and it is necessary to lower the left elbow and raise the right, thus producing the scoliosis of which we have spoken.

If, on the other hand, the child be seated on a bench for one, the height of which is regulated according to his size, the upright pose of the body will be the most natural and comfortable one, and will be maintained without fatigue; the two forearms will easily rest on the table whose slope of 10 degrees will allow greater facility for writing

and reading without forcing the shoulders. It is then indifferent, from a hygienic standpoint, whether a sloping or a vertical handwriting be adopted, for, in both cases the body is kept straight, a very important consideration, from our point of view. Considering, however, as the expert penman Sr. F. Vergara has observed, that sloping letters on paper inclined at 20 to 30 degrees with respect to the edge of the table are more natural, convenient and easy to write, because, then, the right elbow remains almost stationary and represents the centre of the arc of a circle. It may be better to adopt sloping letters, for then, the strokes, sloping as regards the line, are, in reality, perpendicular to the breast and the line to which unites both pupils, so that *upright letters are made on sloping paper*.

Handwriting which is upright or perpendicular to the line, with the paper placed straight before the scholar, is technically harder to write, for if he keeps his right elbow on the desk the movement of the hand is very much forced when beginning a line, and it is necessary to keep displacing the elbow, and if the latter is lowered and the forearm approaches the body he must go on displacing it as he continues his line, a troublesome and tiresome task.

Besides, upright letters are not sufficient of themselves to insure an upright posture of the body, notwithstanding the well known formula of Mrs. George Sand: *Ecriture droite sur papier droit corps droit*; an upright body is not obtained by the form of the letters, but by the union of all the conditions in the desk so as to make the posture physiologically upright, easy and comfortable.

Does this mean that sloping letters, because easily written, are always to be preferred to upright ones? By no means. If sloping letters are more easy and natural when the desk and seat are at a proper height and when the light is good, the case is not the same when these conditions have not been exactly complied with.

The three or four sizes in which desks are generally made are too rigid models for the many different sizes of the children. Besides, they have the defect that as the desk and seat are movable separately, masters do not screw them firmly to the floor, their distance is constantly changing, and for this reason a good permanent minus distance is very difficult to obtain. The ideal desk is one for a single child with lateral supports which can be raised or lowered so as to adjust the two parts according to the child's size, and to remain fixed in their reciprocal relations and firm on the floor.

When a desk is defective either on account of a plus distance or because the table is too low, it is preferable for the children to write vertical letters on straight paper. In this case, although in the diving

position, upright penmanship is more hygienic because it not only tends to keep the vertebral column straighter but the head also straighter and consequently the eyes too are kept straighter. It is sufficient in fact, as I practically proved with various children in the Normal School of Mexico, to change upright letters for sloping, by inclining the paper, to get at once the child's right elbow to advance and the head to incline to the left, so that the strokes of the letters may be perpendicular to the line which unites the two eyes. Under such conditions the proximity to the paper is too great, and the left eye is much nearer than the right, which accounts for the greater degree of myopia in the left observed by several European ophthalmologists. In this case it is better for the scholar to take the trouble, when making upright letters to keep constantly moving the forearm so as to follow the line and not to bend the vertebral column nor incline the head to one side. The same thing happens when the desk is too high, for then the children have a great tendency to take a diagonal posture with the right side in contact with the desk. In forming vertical letters it is necessary, however, that masters should take great care that the paper be placed in the center of the desk and not carried to the extreme right of the child, for then the posture is still more unhygienic than in the diving position; the vertebral column is bent towards the right, the eye muscles, in order to follow the line placed far to the right, have to make a great effort, and the head also has to be turned to the right to alleviate them to some extent.

Even when the desk is perfect and the light well directed and in considerable quantity, yet masters will have to exert themselves to make certain children maintain an upright position.

In the case of some children, bad postures are due to bad habits acquired formerly, in others, they are the results of defective sight, myopia and especially astigmatism, which oblige the child to approach abnormally near in order to get clear images. It is needless to say, that, in this case, no improvement can be made unless the defects of sight are corrected by glasses adapted to remove the near point further from the eyes.

Another very important consideration, when treating of sloping writing, is, that the inclination of the left-hand edge of the paper to the edge of the desk should be as near as possible 90 degrees. In fact the smaller this angle is, the greater is the propensity to advance the right elbow on the table, to incline the head and turn it to the left, which brings with it the detestable diagonal position already spoken of.

To sum up:

I. The bad postures of children while writing are due to the bad

adaptation of school desks rather than to the kind of handwriting adopted.

II. When the conditions of light are good and when the scholar is properly seated at a single desk specially adapted to his size, sloping handwriting on inclined paper (which is really upright handwriting — with respect to the line which unites the pupils — on sloping paper) is the most convenient and easy to write.

III. When the desk is faulty with a plus distance and the top is too low or too high, it is better to use upright letters on upright paper, which allows the trunk to keep straighter and the eyes equidistant from the plane of the desk.

IV. It is necessary to avoid having the paper on the extreme right of the scholar, as this is very injurious to the sight. Masters are recommended to place the paper in the center, forming the largest angle possible with the edge of the desk.

V. Children who suffer from defects of refraction, which compel them to approach too near the paper, cannot maintain a good posture even with irreproachable desks, but should have these defects of sight corrected by proper glasses.